State of Nevada
Proposed Range of Knowledge
Certified Water Treatment Operators

To the left of each subject area all grades will be an expected skill range as follows:

N/A = Not Applicable

A = Apprentice A person who generally works under the supervision of a more skilled person.

Has a general understanding of all epts listed below and functions at the novice level.

J = Journey Person An experienced, competent worker. Has a high level of understanding

of all concepts listed below and performs with minimal supervision.

M = Master A highly skilled person who has a complete understanding of all concepts listed below

and performs with no supervision.

Water Treatment Mathematics	Grade Level	1	2	3	4
Water measurements		A	J	M	M
Formulas (area and volume)		A	J	M	M
Units and conversion factors		A	J	M	M
Water pressure		A	J	M	M
Calculation of dosage, feed rates and flow rates		A	J	M	M
Flow and Velocity		A	J	M	M
Loading Rate Calculations		A	J	M	M
Detention Time		A	J	M	M
Pumping Calculations (Horsepower and Pump capacity)		N/A	J	M	M
CT and Log inactivation		N/A	J	M	M

Sources of Supply	Grade Level	1	2	3	4
Chemcial, physical and bacteriological characteristics; variability		A	J	M	M
Groundwater and surface water supplies		A	J	M	M
Hydrologic cycle		J	M	M	M
Well location, construction and yield		A	J	M	M
Sanitary surveys and source water assessments		N/A	N/A	A	M
Watershed management		N/A	N/A	A	M

Water Treatment Plant Operation	Grade Level	1	2	3	4
Purpose, type configuration and operation		A	J	M	M
Valve types and uses		A	J	M	M
Meters		A	J	M	M
Filters		A	J	M	M
Backwashing		A	J	M	M
Filter Media		N/A	A	M	M
Corrosion -- causes effects control		N/A	A	J	M
Maintenance of pumps and electric motors		N/A	A	J	M
Taste & Odor controls		A	J	M	M
Fluoridation		A	J	M	M
Chlorination		A	J	M	M

		1	2	3	4
Instrumentation		A	J	M	M
SCADA		A	J	M	M
Laboratory Procedures		A	J	M	M

Pumps & Motors	Grade Level	1	2	3	4
Types of pumps		A	J	J	M
Operational principles		A	J	M	M
Mechanical components of centrifugal and positive placement pumps		A	J	M	M
Static, dynamic, suction and discharge head		A	J	M	M
Motors/Drives		A	J	M	M
Chemical Feeders		A	J	M	M
Routine preventative maintence (Packing, bearings, alignment, primi		A	J	M	M

Water Quality	Grade Level	1	2	3	4
Chlorine Residuals		A	J	M	M
Suspended Solids		A	J	M	M
Alkalinity		A	J	M	M
Turbidity		A	J	M	M
Conductivity		A	J	M	M
Coliform Group -- occurrence, significance		A	J	M	M
Temperature		A	J	M	M
MCL, Monitoring, Reporting and Treatment requirements		A	J	M	M
Elements, compunds, hardness and PH		A	J	M	M
Hetrotrophic bacteria		N/A	J	M	M
Sampling Requirements & Techniques		A	J	M	M
Potential waterborne diseases		A	J	M	M
Significance of organcis and inorganics		N/A	A	J	M
Monitoring and Reporting Requirements		N/A	J	M	M
Principles of Biology		N/A	A	J	M
Principles of chemistry		N/A	A	J	M

Disinfection	Grade Level	1	2	3	4
Breakpoint chlorination -meaning, signficance,determination	A	J	M	M	
Disinfectant types	A	J	M	M	
Disinfection by-products	A	J	M	M	

Treatment Types and Processes	Grade Level	1	2	3	4
Ozone		A	J	M	M
Chemical		A	J	M	M
UV Disinfection		A	J	M	M
Blending		A	J	M	M
Arsenic Removal		A	J	M	M
Ion Exchange		A	J	M	M
Membrane		A	J	M	M
Adsorption		A	J	M	M
Softening		A	J	M	M

		1	2	3	4
Coagulation and Flocculation		A	J	M	M
Clarification/sedimentation		A	J	M	M
Aeration		A	J	M	M
Fluoridation		A	J	M	M

Filtration	**Grade Level**	**1**	**2**	**3**	**4**
Dual media and multimedia		A	J	M	M
Rapid sand		A	J	M	M
Deep bed single media		A	J	M	M
Diatomaceous earth		A	J	M	M
Slow sand		A	J	M	M
Bag, microfiltration		A	J	M	M
Maintenance		A	J	M	M
Filter underdrain systems(purpose and configuration)		A	J	M	M
Surface agitation		A	J	M	M
Filter control and operation		A	J	M	M

Safety	**Grade Level**	**1**	**2**	**3**	**4**
General		A	J	M	M
Basic First Aid		A	J	M	M
Respiratory protection		A	J	M	M
OSHA compliance		A	J	M	M
Hazarous materials handling		N/A	A	J	M

Utility Management	**Grade Level**	**1**	**2**	**3**	**4**
Planning		N/A	A	A	M
Personnel		N/A	A	J	J
Maintenance management		N/A	A	J	M
Informaiton Management		N/A	A	A	J
Public Relations		N/A	A	A	J
Emergency Response		A	A	J	M
Finance		N/A	A	A	J
Water Rates		N/A	N/A	N/A	J
Safety Administration		N/A	A	J	M
Security		N/A	A	A	J
CCR's		N/A	A	A	J